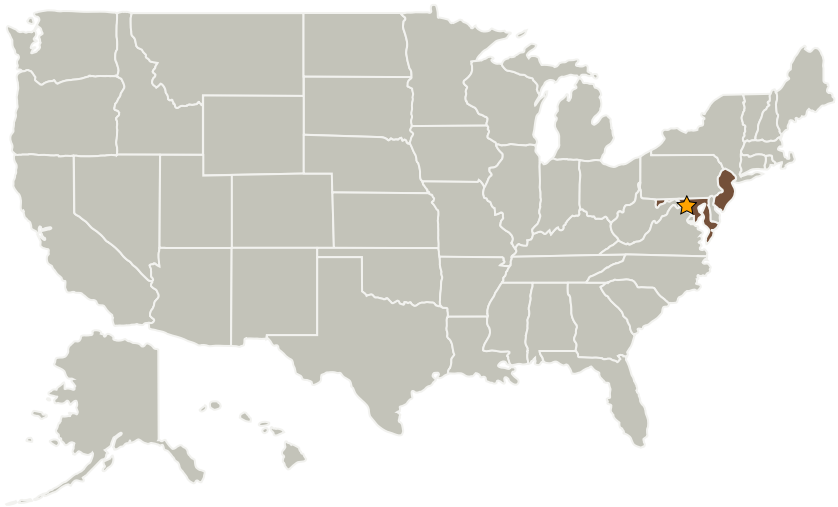
Uncooled Radiation Hard Large Area SiC X-ray and EUV Detectors and 2D Arrays, Phase II

Completed Technology Project (2005 - 2007)

Project Introduction

This project seeks to design, fabricate, characterize and commercialize large area, uncooled and radiative hard 4H-SiC EUV ? soft X-ray detectors capable of ultra low noise photon counting. The detector design and advanced processing technologies combined with the unique material property of 4H-SiC are expected to lead to orders of magnitude improvements to the performance of large area solid state detectors including much lower noise due to the wide bandgap and substantially improved lifetime due to the greatly increased radiation tolerance in comparison to state-of-the-art solid state EUV-soft X-ray detector technologies. In Phase II, detectors and 2D arrays will be designed and fabricated. Eight batches will be fabricated with different detector sizes and different active abs thicknesses. Concentration will be focused on achieving very low dark current and high quantum efficiency based on a novel design. The fabricated detectors and 2D arrays with different optical window sizes will be characterized, including dark current, forward current ideality factor, quantum efficiency. The dominant source and mechanism of the dark current will be investigated to help identify approaches to further reduce the dark current in the privately funded Phase III which will be concentrating on pushing up the yield over 3" wafer for commercialization within one year after the completion of Phase II.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
United Silicon Carbide, Inc.	Supporting Organization	Industry	Monmouth Junction, New Jersey

Primary U.S. Work Locations	
Maryland	New Jersey

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes